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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,162	12/23/2005	Andreas Schuetze	UNAX1-38300	3597

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EXAMINER	
BAND, MICHAEL A	

ART UNIT	PAPER NUMBER
1723	

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05/09/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,162	SCHUETZE ET AL.	
	Examiner	Art Unit	
	MICHAEL BAND	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16 and 33-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 33-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 April 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/19/2010 has been entered.

Drawings

2. The drawings were received on 4/19/2010. These drawings are accepted.

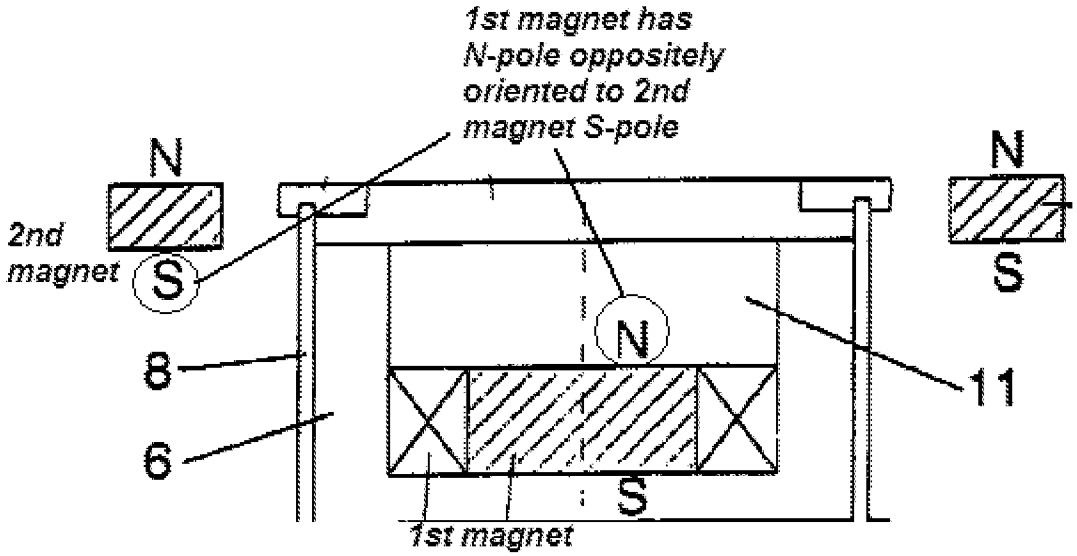
Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-7, 10,15, 33-41, 44, and 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Larrinaga (US 2004/0112736), equivalent to Goikoetxea et al (WO 02/077318).

With respect to claims 1-3, 15, 33-37, and 47, Larrinaga discloses an arc evaporator comprising a target (i.e. cathode) [2] and a substrate [10] to be coated in a vacuum chamber (abstract), where fig. 1 depicts said target [2] in an effective area of a device comprising two magnet systems [3]-[5] with oppositely oriented poles. The cropped figure below of fig. 1 serves to further clarify the oriented poles of the magnet system.



Larrinaga further discloses that the perpendicular component of the magnetic field generated by the two magnet systems [3]-[5] is zero over the whole surface of the target [2] (p. 2, para 0026). Fig. 1 further depicts the target [2] having a greater part that is at least 60% from the middle of said target [2] to a rim (i.e. end) of said target [2].

With respect to claims 4-5 and 38-39, Larrinaga further discloses in figs. 3-5 the perpendicular magnetic field changing from the rim of the target [2] to the middle of said target [2], with the parallel magnetic field being approximately zero at the center of said target [2] and rising towards said rim of said target.

With respect to claims 6-7 and 40-41, Larrinaga further discloses in fig. 1 the two magnet systems [3]-[5] comprising a first magnet system [5] is an electromagnet placed behind the target [2]. Larrinaga further discloses in fig. 1 the first magnet system [4]-[5] comprising an electromagnet coil having inner dimensions that coincide with a deviation from a maximum of plus/minus 30% with a projection of the outer dimensions of the surface.

With respect to claims 10 and 44, Larrinaga further discloses in fig. 7 the first magnet system [4]-[5] and a second magnet system [3'] having opposite poles and arranged coaxially to said first magnet system [4]-[5].

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 8-9 and 42-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larrinaga (US 2004/0112736), equivalent to Goikoetxea et al (WO 02/077318), as

applied to claims 1 and 35 above, and further in view of Curtins (WO 02/099152), equivalent to Curtins (US 2004/0154919) cited below.

With respect to claims 8-9 and 42-43, the reference is cited as discussed for claims 1 and 35. However Larrinaga is limited in that while it is taught for the first of the two magnet system to be an electromagnet, it is not suggested for said first to be one or more permanent magnets.

Curtins teaches an arc evaporator comprising a target [14] and a magnet arrangement [42] behind said target [14] for vacuum coatings (abstract; fig. 1; p. 1, para 0001-0002). Curtins also teaches that it is known in evaporation devices for the magnet arrangement [42] to comprise electromagnets, permanent magnets, or combinations thereof (p. 1, para 0008). It is expected that the combination of magnets has either a low field strength or a distance between said combination and the target results in a low field strength on the surface of said target. If not, it must be due to a claim limitation not currently present.

Since the prior art Curtins recognizes the equivalency of electromagnets, permanent magnets, and combinations thereof in the field of vacuum arc discharge coatings, it would have been obvious to one of ordinary skill in the art to replace the electromagnet behind the target taught by Larrinaga with the permanent magnet of Curtins as it is merely the selection of functionally equivalent magnet arrangements recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so.

7. Claims 11 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larrinaga (US 2004/0112736), equivalent to Goikoetxea et al (WO 02/077318), as applied to claims 10 and 44 above, and further in view of Kadlec et al (US Patent No. 5,234,560).

With respect to claims 11 and 45, the reference is cited as discussed for claims 10 and 44. However Larrinaga is limited in that while a second magnet system is present, it is not suggested to place said second magnet system behind the first magnet system.

Kadlec et al teaches deposition onto a substrate from a target (abstract), where fig. 1A depicts a first magnet system [15] comprising an electromagnet coil behind a target [2] and a second magnet system [17] comprising an electromagnet coil behind said first magnet system [15]. Kadlec et al cites the advantage of the second magnet system being behind the first magnet system as giving the apparatus the ability to confine a dense plasma (col. 5, lines 62-68; col. 6, lines 1-34).

8. Claims 12-14 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larrinaga (US 2004/0112736), equivalent to Goikoetxea et al (WO 02/077318), as applied to claims 10 and 44 above, and further in view of Ramalingam (US Patent No. 5,298,136).

With respect to claims 12-14 and 46, the reference is cited as discussed for claims 10 and 44. However Larrinaga is limited in that while the second magnet system comprising a second coil is present, it is not suggested to move said second magnet system in front of the target.

Ramalingam teaches an apparatus for controlled arc coating of substrates utilizing cathodes or targets (abstract), where fig. 1 depicts a vacuum arc deposition apparatus [10] with a target [20] with two magnet systems [19], [30] having opposite poles as depicted in fig. 3-7. Fig. 15 depicts a first magnet system [180] comprising an electromagnet coil behind the target [167], with a second magnet system [190] comprising an electromagnet coil in front of said target [167] and coaxial with said first magnet system [180]. Since fig. 15 depicts the electromagnet coil of the second magnet system [190] surrounding the electromagnet coil of the first magnet system [180], the diameter of said second magnet system [190] is larger than the first magnet system [180]. Ramalingam cites the advantages of the second magnet system as offsetting arc impedance changes and changing the arc impedance to change arc current without adjusting the arc power supply when constant voltage is provided (col. 11, lines 17-27).

It would have been obvious to one of ordinary skill in the art to place the second magnet system in front of the target as taught by Ramalingam for the second magnet system of Larrinaga to gain the advantages of offsetting arc impedance changes and changing the arc impedance to change arc current without adjusting the arc power supply when constant voltage is provided.

9. Claims 16 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larrinaga (US 2004/0112736), equivalent to Goikoetxea et al (WO 02/077318), as applied to claims 1 and 35 above, and further in view of Struempfel et al (US Patent No. 6,361,668).

With respect to claims 16 and 48, the reference is cited as discussed for claims 1 and 35. However Larrinaga is limited in that while the target is a cathode, it is not suggested that the target can be an anode.

Struempfel et al teaches in fig. 1 a target [12], and two magnet systems [7]-[8] behind said target [12], with a target voltage applied to said target [12] (col. 3, lines 28-30). Struempfel et al also teaches that at a particular time, the target [12] has a positive voltage applied and at a subsequent time, said target [12] has a negative applied (col. 1, lines 49-55), thus said target [12] is capable of being either a cathode or an anode is dependent upon time and user function. Struempfel et al cites the advantage of having the target capable of being either a cathode or anode as increasing utilization of the target (col. 1, lines 65-67).

It would have been obvious to one of ordinary skill in the art to have the target capable of being either a cathode or anode as taught by Struempfel et al for the target of Larrinaga to gain the advantage of increased utilization of the target. In addition, since the prior art of Struempfel et al recognizes the equivalency of a cathode and an anode in the field of target deposition, it would have been obvious to one of ordinary skill in the art to replace cathode target of Larrinaga with the cathode/anode target of Struempfel et al as it is merely the selection of functionally equivalent target depositions recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so. In addition, it would have been obvious to one of ordinary skill in the art to try the target as an anode or anode/cathode in an attempt to improve target utilization, as a person with ordinary skill has good reason to pursue the known options

within his or her grasp since there exists only three options: a target cathode, a target anode, or a target cathode/anode.

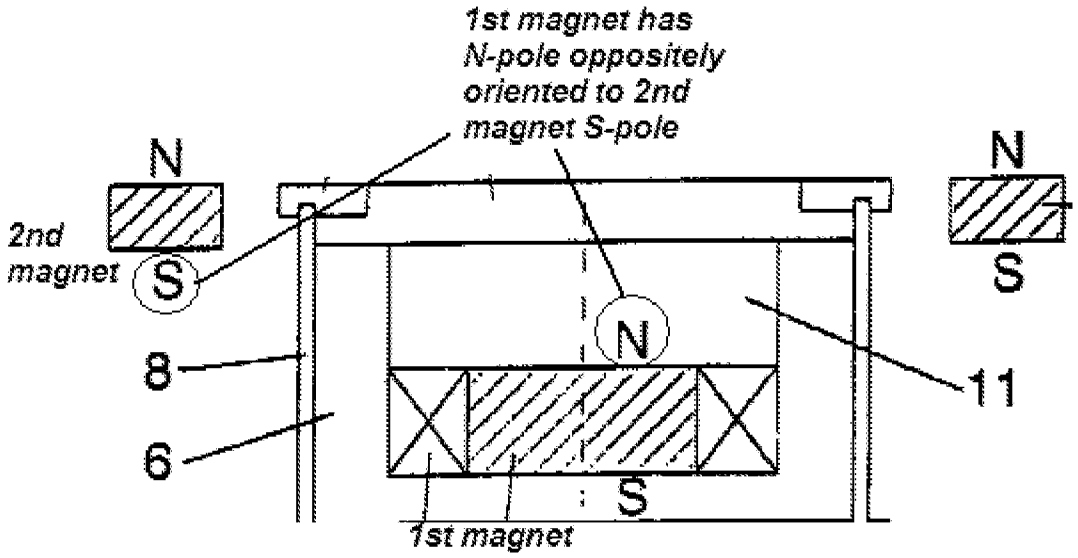
Response to Arguments

102 Rejections

10. Applicant's arguments filed 4/19/2010 have been fully considered but they are not persuasive.

11. On p. 8, the Applicant argues that Larrinaga does not teach a two magnet system with oppositely oriented poles.

The Examiner respectfully disagrees and submits the following from above: fig. 1 depicts said target [2] in an effective area of a device comprising two magnet systems [3]-[5] with oppositely oriented poles, where the cropped figure below of fig. 1 serves to further clarify the oriented poles of the magnet system.



12. Applicant's argument, see p. 8, with respect to the rejection of claim 8 under 102 has been fully considered and is persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Larrinaga (US 2004/0112736) and Curtins (US 2004/0154919).

13. All other arguments are directed towards the subject matter above and have been addressed accordingly.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent Nos. 6,036,828; 6,334,405; US 20010035348.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1723

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1723